

**San Francisco Peaks Ragwort
(*Packera franciscana*)
5-Year Review:
Summary and Evaluation**



Photo by Carolyn Hull-Sieg, U.S. Forest Service, Rocky Mountain Research Station

**U.S. Fish and Wildlife Service
Arizona Ecological Services Office
Flagstaff, Arizona
August 23, 2021**

5-YEAR REVIEW

San Francisco Peaks Ragwort (*Packera franciscana*)

1.0 GENERAL INFORMATION

1.1 Listing History

Species: Species

Date listed: November 22, 1983

FR citation(s): 48 FR 52743

Classification: Threatened species, with critical habitat

Critical habitat/4(d) rule/Experimental population designation/Similarity of appearance listing: Areas designated as critical habitat are the summits of Agassiz and Humphreys Peaks and the surrounding slopes and alpine area, San Francisco Peaks, Coconino National Forest, Coconino County, Arizona (Township 22 North, Range 7 East, N½ of the NW¼ of Section 5; Township 23 North, Range 7 East, W½ of Section 32 and W½ of Section 29) (48 FR 52743). Primary constituent elements for the ragwort are: (1) the loose cinder talus slopes of the San Francisco Peaks alpine tundra, and (2) the absence of disturbance and damage from hikers.

1.2 Methodology used to complete the review:

The U.S. Fish and Wildlife Service (Service) most recently evaluated the biology and status of the San Francisco Peaks ragwort (*Packera franciscana*) as part of a status review conducted on October 22, 2010. For this status review, we examined whether new information was available and whether that new information would alter or affect analyses and conclusions we made in the previous status review. We solicited data for this current review from interested parties through a Federal Register notice announcing the review on May 5, 2021 (85 FR 23976). We also contacted Coconino National Forest staff and species experts, U.S. Forest Service Rocky Mountain Research Station (RMRS) species experts, Hopi Tribe staff, Navajo Nation staff, and stakeholders to request any data or information we should consider in our review. Additionally, we conducted a literature search and a review of information in our files. We did not receive any new data following our request for information.

Since the Service listed the ragwort, the name has changed from San Francisco Peaks groundsel (*Senecio franciscanus*) to San Francisco Peaks ragwort (*Packera franciscana*). This document will use *P. franciscana* or San Francisco Peaks ragwort or ragwort to refer to the plant. However, when referring to older documents such as the Recovery Plan, we may use the species name we listed the plant under in order to refer to the correct name of the document.

1.3 FR Notice citation announcing the species is under active review:

86 FR 23976: Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews of 23 Species in the Southwest. May 5, 2021.

2.0 REVIEW ANALYSIS

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of “endangered species” or “threatened species.” The Act defines an “endangered species” as a species that is “in danger of extinction throughout all or a significant portion of its range,” and a “threatened species” as a species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act requires that we determine whether a species meets the definition of “endangered species” or “threatened species” due to any of the five factors.

The identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an “endangered species” or a “threatened species.” In assessing whether a species meets either definition, we must evaluate all identified threats by considering the expected response of the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species—such as any existing regulatory mechanisms or conservation efforts. The Service recommends whether the species meets the definition of an “endangered species” or a “threatened species” only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

2.1 Updated Information and Current Species Status

2.1.1 Biology and Habitat:

Packera franciscana is a dwarf alpine plant in the sunflower family (Asteraceae) that is endemic to the San Francisco Peaks, Coconino National Forest, in northern Arizona (Fowler and Sieg 2011). The plant grows on gravelly, sandy loams associated with talus in alpine fellfield above 10,900 feet in elevation (USFWS 1983, 1987). Fellfield habitats are comprised of slopes, usually alpine or tundra, where the dynamics of frost (freeze and thaw cycles) and of wind give rise to characteristic plant forms in scree (talus) interstices. The ragwort is a clonal plant and reproduces mainly via rhizomes, but sexual reproduction also occurs. The plant develops as small clones propagated vegetatively from the branched rhizomes. Rhizomes are horizontal underground plant stem capable of producing the shoot and root systems of a new plant and ramets are the upright stems. Within a clone, ramets are genetically identical individuals. Frost action and gravitational movement of the alpine fellfield break up the clones, which in turn further spreads the individual ramets, which develop, and break up again. To assess the number of plants, researchers typically count ramets. Flowering is from August to early September, fruits mature in mid-September, and the plant becomes winter-dormant in early October (USFWS 1983).

On the San Francisco Peaks, there are approximately 1,200 acres of tundra and *P. franciscana* occurs in a patchy distribution across approximately 213 acres within the

alpine zone (Dexter 2007). On the San Francisco Peaks, ragwort plants occur on Humphreys, Agassiz, Fremont, and Doyle peaks, and along the north rim that extends northeast from Humphreys Peak. *P. franciscana* surveys have estimated a total population of 90,000 to 135,000 ramets (USFWS 2014). The species appears to be stable based upon the apparent persistence and density of ramets, the continuous occupancy of monitored areas, and implementation of conservation measures to protect the plant and its habitat (USFWS 2010, Fowler and Sieg 2011, Fowler *et al.* 2015, USFS 2018).

Fowler and Overby (2016) conducted a study to describe the relationship between snow duration and *P. franciscana* abundance. The five-year arithmetic mean of ramet counts showed a significant difference between the snowbed (the area covered by snow for an extended period) and snow-free sections of the study area, with the snow-free area having a higher ramet counts. The authors posited that active talus shift, caused by gravitational processes and frost heave when snow is present, may inhibit *P. franciscana* colonization and growth on upper, steep talus slopes because the constant shifting results in less stable habitat for the seedlings, which may increase seedling mortality (Fowler and Overby 2016).

Johnson and Ayers (2015) collected morphometric and molecular data that indicates *P. franciscana* is hybridizing with another *Packera* species, *P. wernerifolia*, at Snowslide Spring in the Inner Basin on the San Francisco Peaks. The morphological data indicated that hybrid individuals have an intermediate appearance or look more like *P. franciscana*, and that certain leaf traits varied significantly among the parental species and hybrids. The genetic (molecular) data analysis found that hybrids shared alleles with both parental species and indicated that hybridization may be more widespread than initially thought. In order to determine if hybridization is more widespread, the authors suggest mapping high-elevation *P. wernerifolia* populations, conducting surveys for additional hybrid plants, and conducting a more thorough genetic analysis of *P. franciscana* to assess the extent of the hybrid zone. The authors noted three potential evolutionary consequences of hybridization for *P. franciscana*: (1) hybrid swarms may be fleeting, having no long-lasting effect on the current parental species, maintaining the two species; (2) hybridization could lead to the extinction of *P. franciscana*; and, (3) the hybridization could result in an increased ability for ragwort to respond to environmental changes, such as climate change (Johnson and Ayers 2015).

2.1.2 Threats Analysis (threats, conservation measures, and regulatory mechanisms):

The listing rule (USFWS 1984) and the Recovery Plan (USFWS 1987) identify the trampling and habitat destruction by hikers, and potential effects from the Arizona Snowbowl Ski Resort (Factor A) as the threats to the species. In 2010 (USFWS 2010), we identified its narrow geographic distribution, apparent specificity to volcanic talus habitat, and climate change as additional threats.

The Forest Services' implementation of conservation measures as part of the Special Use Permit with The Arizona Snowbowl Ski Resort has significantly minimized this

threat (USFWS 2010, 2017, 2019). In addition, the Coconino National Forest Land and Resource Management Plan (USFS 2018, Forest Plan) contains desired conditions and guidance for management and protection of the alpine tundra where the ragwort occurs. Specifically, the guideline for alpine tundra states “Recreational activities should be managed to maintain or improve ecological attributes, ecological processes, and habitat for native biota” (USFS 2018). In addition, the Forest Plan provides management guidelines for wilderness to minimize recreational effects to the ragwort (USFS 2018). Given the stable status of the species (Fowler and Sieg 2011, Fowler *et al.* 2015) and implementation of the Forest Plan, this threat is not resulting in changes to the species’ status at this time.

In 2017, The Arboretum at Flagstaff (TE Permit 226653-0) collected 4,475 seeds from 69 individual ragwort plants on Agassiz Peak. In coordination with the Service, they sent the seeds to the National Center for Genetic Resources Preservation in Fort Collins, Colorado for long-term conservation storage. This action will assist in the conservation of the species by preserving genetic material for future research and developing a seedbank for propagation, if needed.

2.2 Synthesis:

P. franciscana is an endemic habitat specialist with a limited distribution, but information since our last status review does not indicate any significant changes in the species’ status or threats. Published monitoring data indicates that the San Francisco Peaks ragwort continues to occupy and persist within suitable habitat. We lack information on the genetic diversity and some aspects of the breeding biology of the plant, and we need data regarding the long-term effects to *P. franciscana* from hybridization with *P. wernerifolia*. The Forest Service continues to implement conservation measures to protect the plant and its habitat from recreation and trampling, as identified in the Recovery Plan (USFWS 1987). Therefore, although there is information needed that would improve our ability to manage for *P. franciscana*, there is no information that indicates the species’ status or the size and severity of threats has changed.

After reviewing the best available scientific information, we conclude that the San Francisco Peaks ragwort remains a threatened species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the Act and analysis of the status of the species in our October 22, 2010, 5-year review (USFWS 2010) remains an accurate reflection of the species’ status.

3.0 RESULTS

3.1 Recommended Classification:

___ **Downlist to Threatened**

___ **Uplist to Endangered**

___ **Delist** (*Indicate reasons for delisting per 50 CFR 424.11*):

___ *The species is extinct*

___ *The species does not meet the definition of an endangered species or a threatened species (i.e., is recovered, or new information on status and threats*

indicate species does not meet definitions)

 The listed entity does not meet the statutory definition of a species.

X **No change is needed**

3.2 New Recovery Priority Number:

We do not recommend changing the Recovery Priority Number.

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

The foremost recommendation for action is that, if possible, given workloads, we conduct a Species Status Assessment for *P. franciscana* to guide the development of a recovery plan revision. In addition, the following recommendations for future actions are the result of discussions and/or published information regarding the species' needs with recognized experts from the RMRS, The Arboretum at Flagstaff, and managers from the Coconino National Forest.

1. We recommend that the Service, RMRS, and Coconino National Forest conduct long-term monitoring of the *P. franciscana* population centroid determined by Fowler *et al.* (2015) to allow detection of altitudinal migration.
2. We recommend that the Service, RMRS, Coconino National Forest, and other partners conduct research examining the effect of natural and human-caused disturbance on *P. franciscana* persistence and distribution, including damage potentially caused by trampling and habitat destruction by hikers and potential effects from the Arizona Snowbowl Ski Resort.
3. We recommend that the Service, RMRS, Coconino National Forest, and/or other partners conduct research on the reproductive biology of *P. franciscana* evaluating the genetic diversity within and between clones, and the breeding system involved with sexual reproduction, pollination, and fertilization.
4. We recommend that the Service, RMRS, Coconino National Forest, and other partners conduct research on ragwort seed viability, seedling establishment, survivorship, and fecundity to increase our understanding of the life history characteristics of this species.
5. We recommend that the Service work with The Arboretum at Flagstaff, and other partners to collect additional seed to replenish the seed in storage as well as for germination trials.
6. We recommend that the Service work with The Arboretum at Flagstaff, or other interested partners, to conduct a thorough population genetic analysis of *P. franciscana* to assess the extent of the hybrid zone with *P. wernerifolia* on the San Francisco Peaks, and to investigate whether phenology or elevational distribution of one or both species is changing due to climatic shifts.

7. We recommend that, if possible, given workloads, the Coconino National Forest work with us to develop a current Wilderness Management Plan for the San Francisco Peaks wilderness that identifies management actions to protect *P. franciscana* and its habitat.

5.0 REFERENCES

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U.S. FISH AND WILDLIFE SERVICE

5-YEAR REVIEW of San Francisco Peaks Ragwort (*Packera franciscana*)

Current Classification:

Recommendation resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: Not applicable.

FIELD OFFICE APPROVAL

Lead Field Supervisor, Fish and Wildlife Service, Arizona Ecological Services Office

Approve _____